

For Consideration: International Guidelines for Compliance and Enforcement of Vehicle Emission Standards

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G20
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Key Messages

- The Volkswagen defeat device case has highlighted a major shortcoming in government oversight of motor vehicle emissions control programs in nearly all major markets.
- I know of no document that explicitly describes international best practices for government programs to ensure compliance with motor vehicle emission standards.
- A statement by the G20 describing an ideal government compliance program would make a significant contribution to the international discourse on this important subject.

Background on VW defeat device case

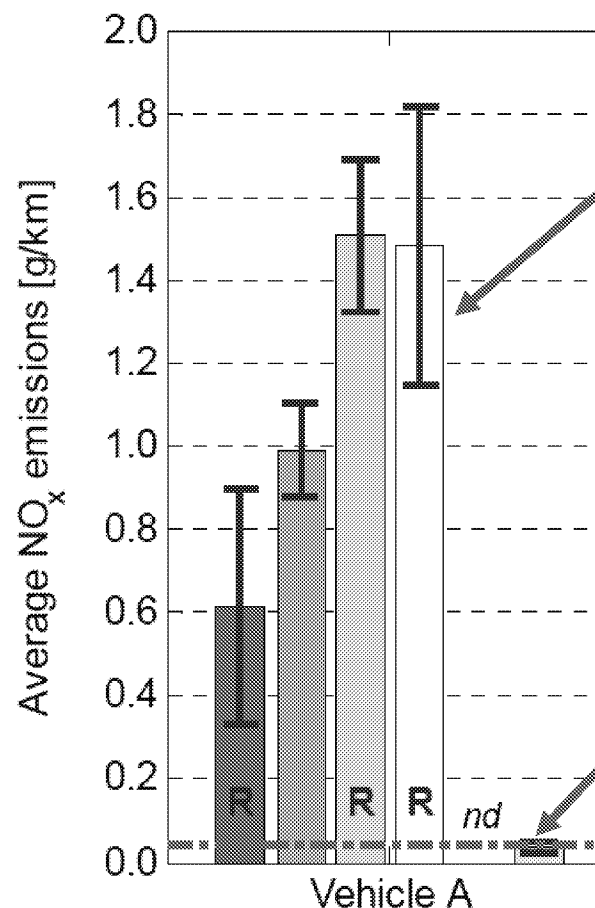
- **Timeline**
- **Research**

Timeline of Volkswagen Defeat Device Investigation and Discovery

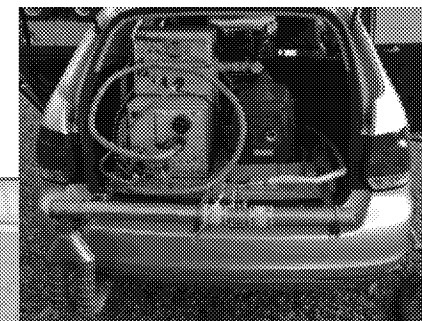
- **2011/2012** – Joint Research Center of the European Commission releases real world emissions data on light-duty diesels; ICCT's European office concerned with elevated real world NOx emissions from Euro 4/5 passenger diesels in Europe.
- **February 2013** – ICCT contracts with West Virginia University to conduct real world emissions testing on three passenger diesel vehicles in California. CARB provides in-kind support via its test center in El Monte.
- **May 2014** – ICCT publishes its findings which show two of the three cars with 5 – 35X times the legal limit under normal driving conditions. We inform EPA, CARB, and VW.
- **December 2014** – VW agrees to a voluntary recall of passenger diesels.
- **May 2015** – CARB retests recalled vehicles and finds some improvement, but emissions are still high.
- **July-September 2015** – US EPA informs VW that it will not be granted license to sell 2016 vehicles in the US if the Agency's questions are not addressed fully. VW admits to defeat devices on September 3, 2015.
- **September 18, 2015** – US EPA, DOJ, and CARB announce a notice of violation against VW for using illegal defeat devices.
- **September 22, 2015** – VW announces that 11 million 2009-2015 diesel cars worldwide have the same "defeat device" software.
- **September 25, 2015** – US EPA and CARB issue updated requirements related to evaluation of defeat devices

To Be Continued . . . The case continues to evolve in the US and around the world with additional testing, new revelations about defeat devices in other countries . . .

Results from the ICCT / WVU report on real world emissions from US passenger diesels (VW Jetta, Passat and BMW X5)



Road tests with PEMS



Chassis dyno measurements

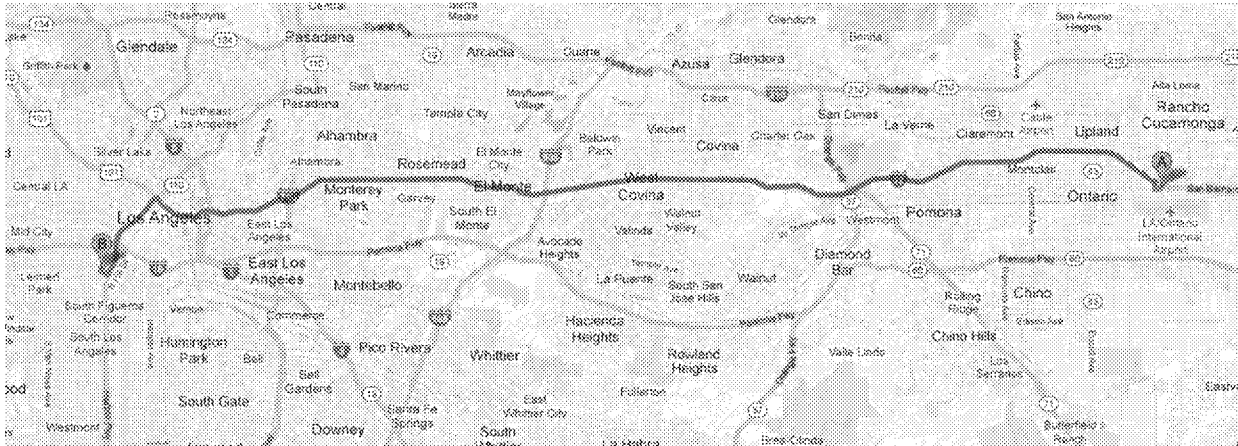


Photo credit: AVL / ERMES Group
Vehicle photos unrelated to the results shown

- Route 1: highway
- Route 2: urban (LA)
- Route 3: rural-up/downhill
- Route 4: urban (San Diego)
- FTP-75 'Bag-3' (Chassis Dyno)
- Tier2-Bin5 Standard

ICCT / WVU Study - Testing Routes

Route 1 – Highway (Los Angeles to Ontario, CA)



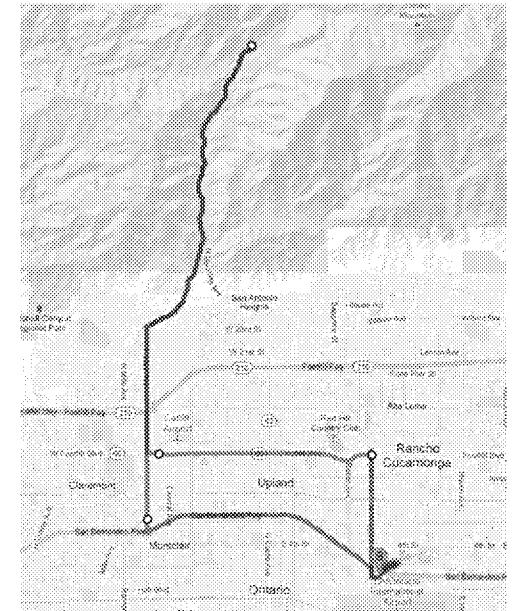
Route 4 – Urban
(San Diego)

Route 5 – Urban
(San Francisco)

Route 2 – Urban (Los Angeles) – similar to original route used for development of the LA-4 / FTP-72

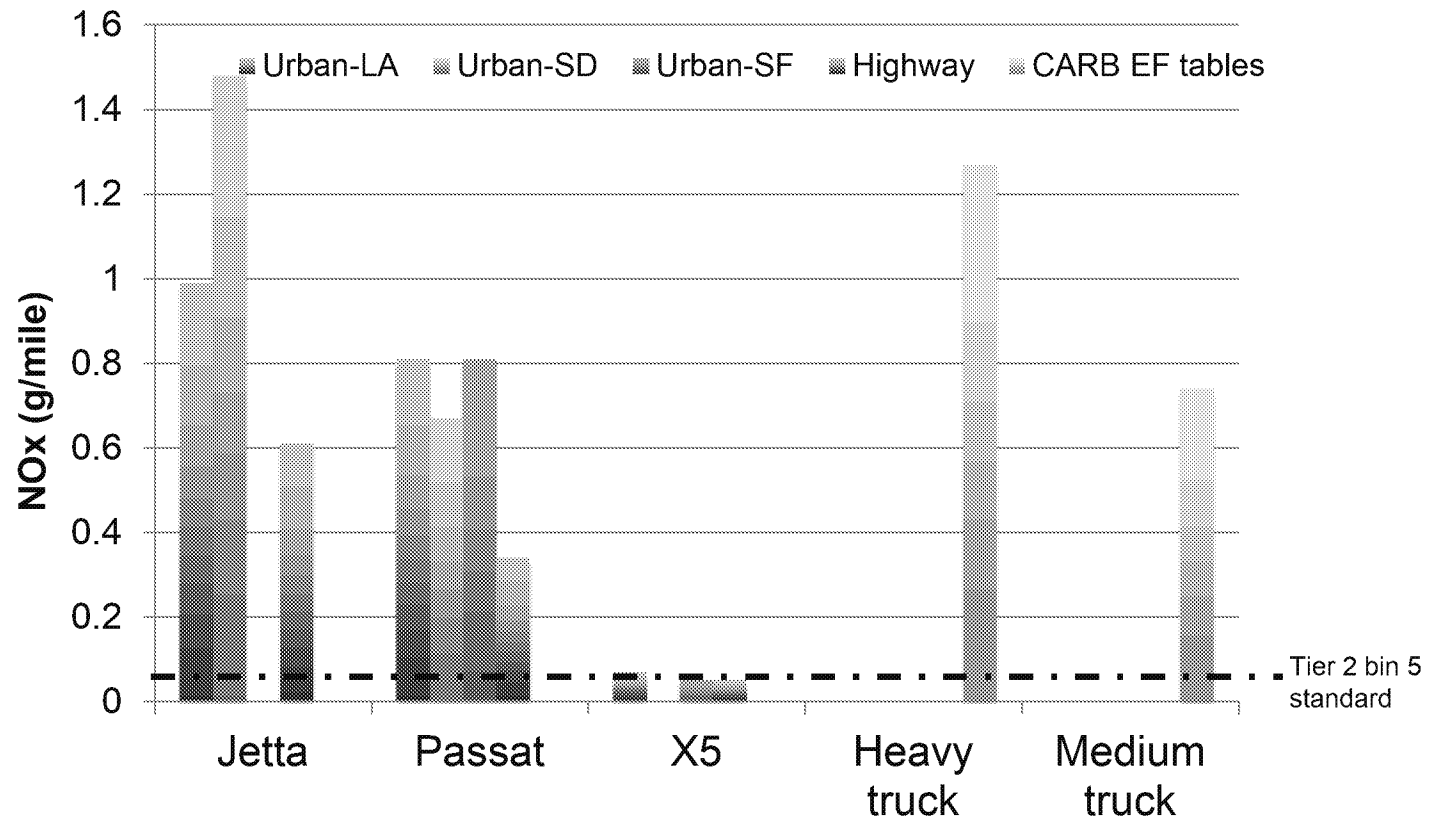


Route 3 - Suburban
and Uphill/Downhill



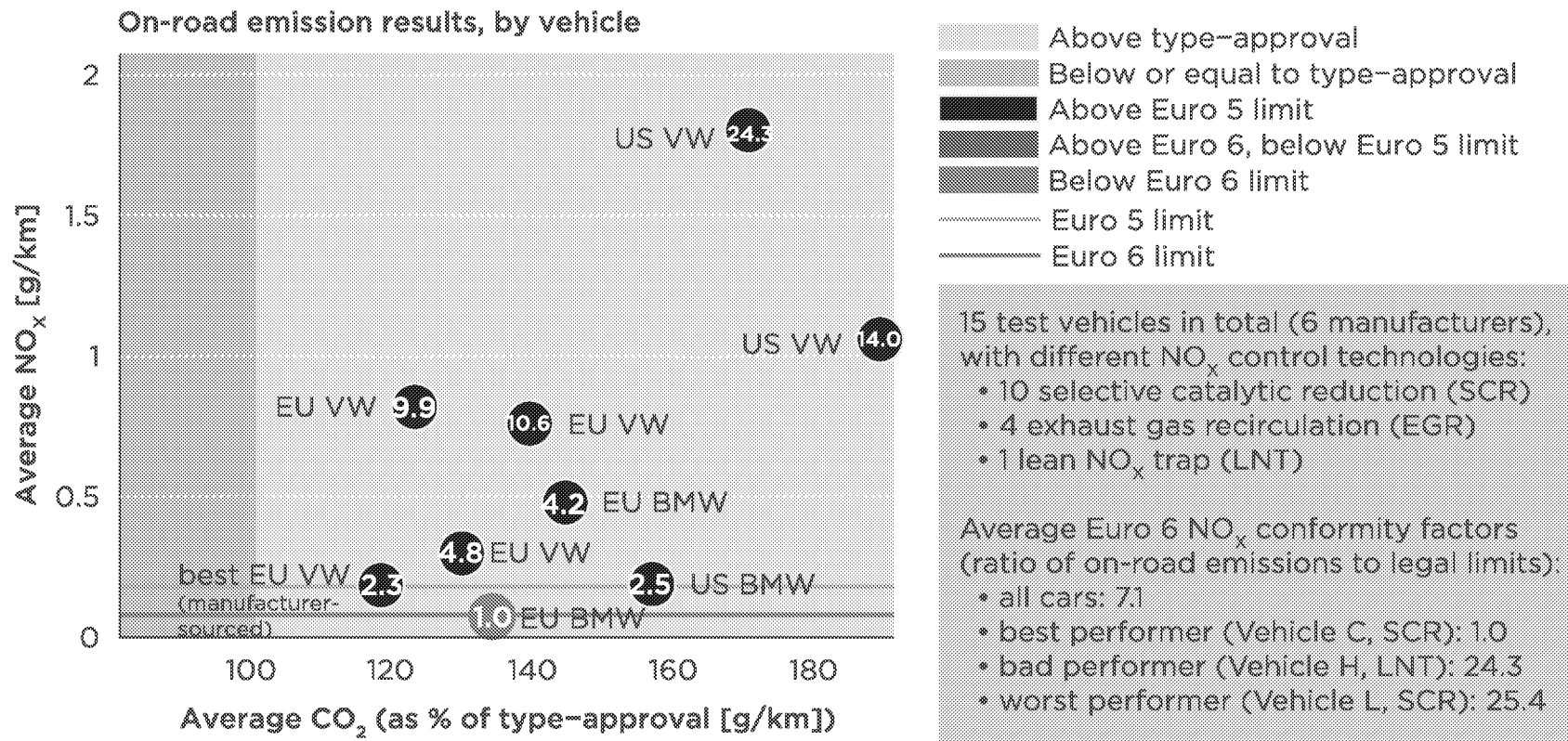
Route NOx emissions (total distance/total NOx)

- All vehicles met emission standards on FTP
- Lowest NO_x during highway driving
- The BMW X5 had high NOx emissions only during up/downhill driving (not shown)
- Urban NOx emissions from VW Jetta similar to 80,000 GVW 18-wheeler; VW Passat similar to medium-duty truck

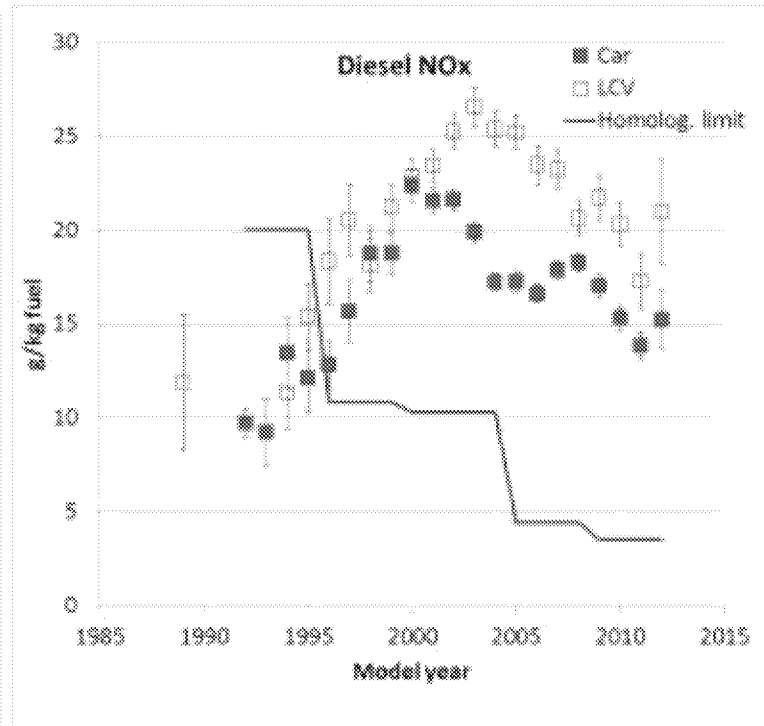
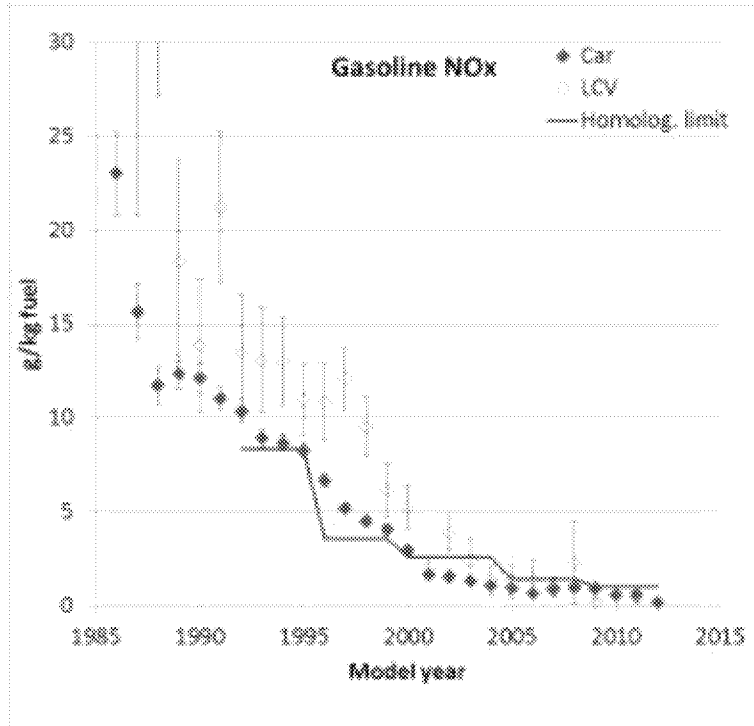


ICCT's diesel emissions meta-study

On-road Euro 6 conformity factors for selected cars (US factors would be 2x)



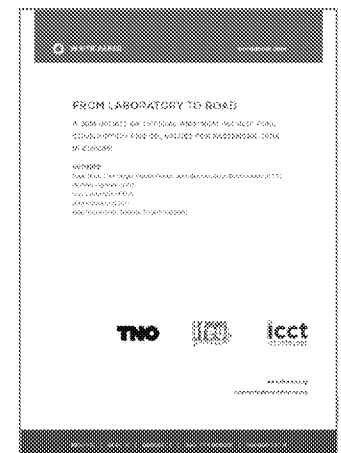
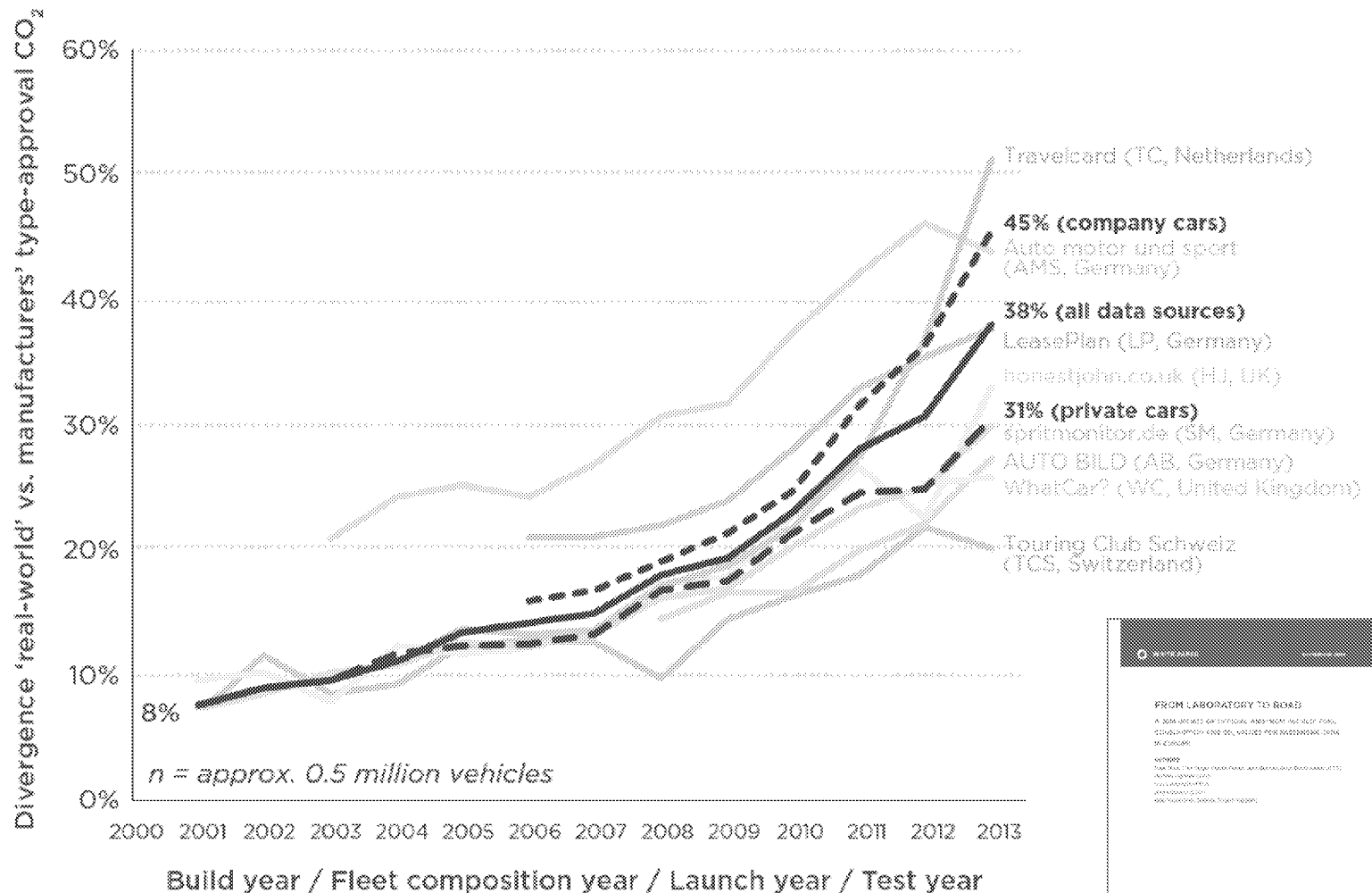
ICCT's PEMS testing confirmed by 13 years of Remote Sensing data



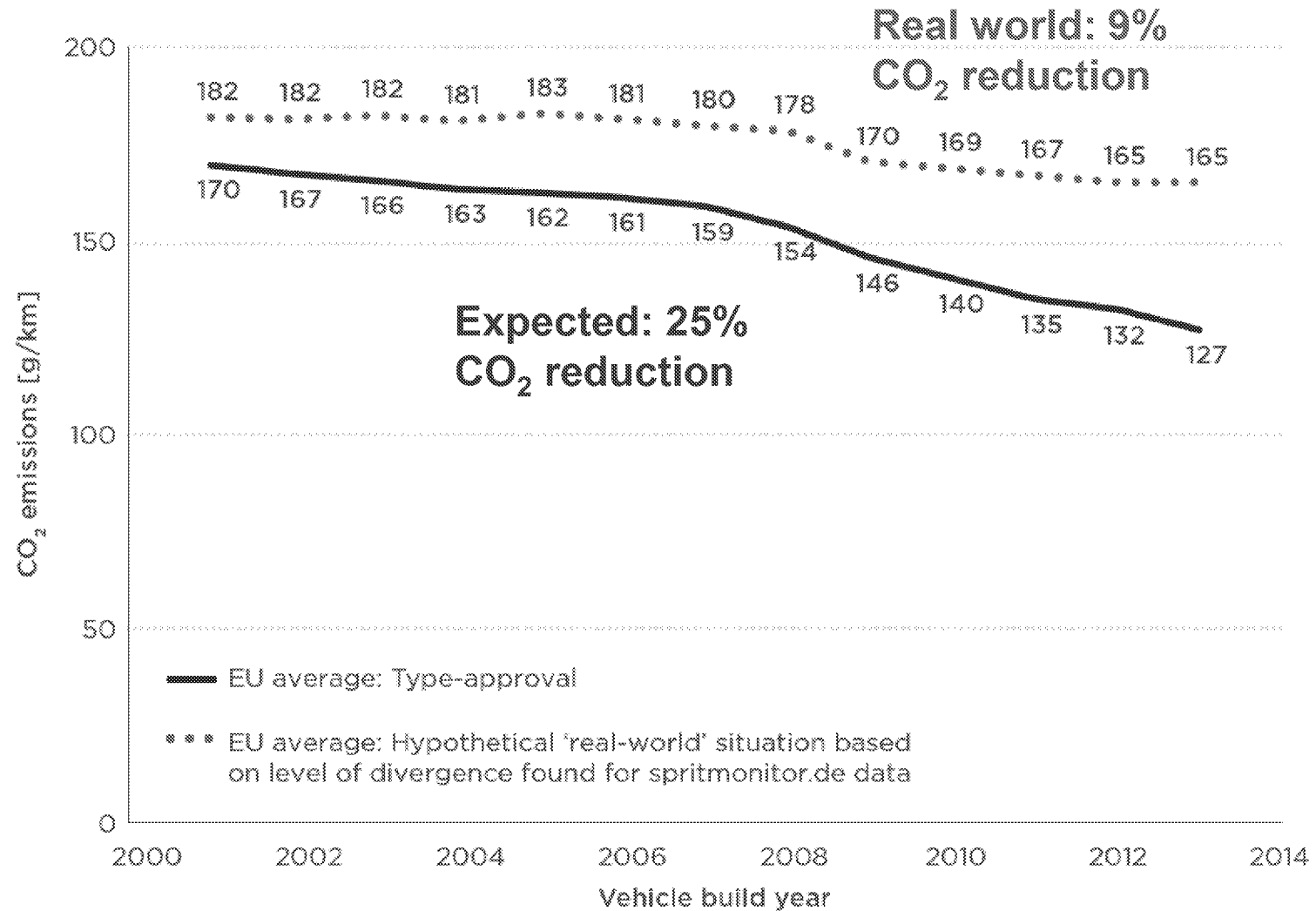
Chen & Borken-Kleefeld, Real-driving emissions from cars and light commercial vehicles - Results from 13 years remote sensing at Zurich/CH Atmospheric Environment, 88:157-164 (May 2014)

It's not just about NOx . . .

Real-world CO₂ in EU is 30+% higher than claimed



Growing gap in real world v. type approval emissions cut expected gains from European CO₂ standards more than half.



Guidance on Compliance and Enforcement

- Importance
- Key elements
- Precedent

Importance and Timeliness

- The Volkswagen defeat device scandal case has revealed a major shortcoming in government oversight of compliance and enforcement in major markets around the world.
- Compliance and enforcement is the bedrock of any effective policy, as demonstrated by the substantial amount of discussion around monitoring, verification and reporting under the climate change international agreement.
- As emission standards grow more stringent, and the cost of compliance grows larger, there will be a continued and growing financial incentives for auto companies to seek to evade emission standards.
- This challenge of excessive emissions (with or without legal noncompliance) is taking place not only in the US and Europe, but also in many other countries within the G20 (China, India, Mexico, Brazil).
- Noncompliance threatens to undermine efforts to address local air pollution and climate change.
- Consumer confidence in green products and government ability to deliver on environmental promises are also threatened by noncompliance.

Key elements of G20 Guidance on Compliance and Enforcement

1. **VEHICLE TESTING.** Effective testing that includes pre-production and post-production vehicle testing under both laboratory conditions and under real world conditions
2. **LEGAL AUTHORITY.** Legal authority including recall and repair of vehicles with faulty emissions technologies, financial penalties sufficient to remove financial profits obtained from noncompliance, and annual license to permit or prohibit the sale of vehicles into domestic marketplace.
3. **GOVERNMENT CAPACITY.** Government agency institutional capacity and resources capable of conducting credible testing and implementing an effective compliance program. Fuels testing is also important and should be included in this statement.

Contact Information

Background and Additional Reading

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Anup Bandivadekar, Program Director (San Francisco), anup@theicct.org

Background and Additional Reading:

<http://www.theicct.org/news/epas-notice-violation-clean-air-act-volkswagen-press-statement>

<http://theicct.org/news/faq-use-nox-emissions-diesel-passenger-cars>

<http://www.nytimes.com/2015/09/22/business/it-took-epa-pressure-to-get-vw-to-admit-fault.html?smid=nytcore-iphone-share&smprod=nytcore-iphone>

http://www.huffingtonpost.com/margo-t-oge/the-silver-lining-in-the-vw-emissions-cloud_b_8222726.html

<http://www.bbc.com/news/business-34519184>

http://www.rollcall.com/news/the_volkswagen_emissions_scandal_and_the_epa_commentary-243996-1.html